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SAGE System and Applications Research

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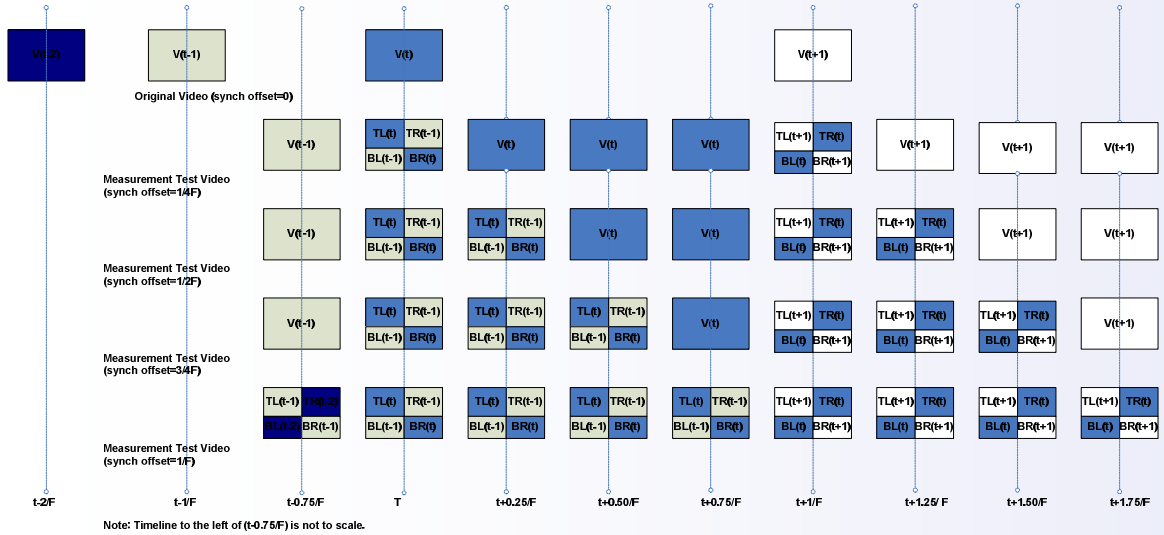
Organization

- SAGE System and Applications Research:
  - Tiled Display Inter-tile Synchronization Design Tool
  - New SAGE Inter-tile Synchronization Algorithm
  - SAGE Application Toolkit
- References

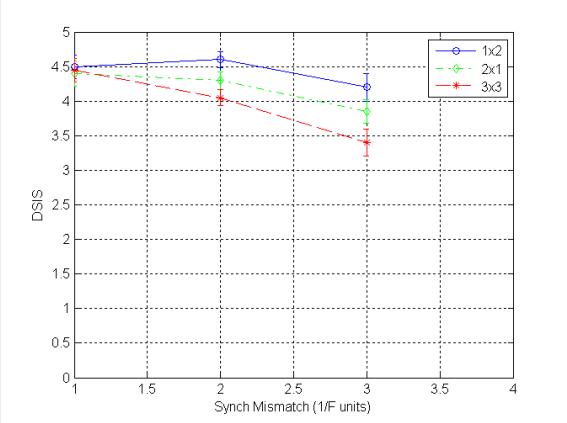
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Tiled Display Inter-Tile Synchronization Design Tool

- We have developed a psycho-visual design tool for synchronization-mismatch-perception evaluation for large ultra high resolution tiled displays.
- The tool uses tile matrix dimensions, tile resolution, tile bezel size for the target tile display and can provide design parameters for an inter-tile synchronization algorithm.
- This tool can be used for design of low cost tiled display systems which utilize distributed synchronization mechanisms for image display and do not require higher end graphics cards with Genlock/ Frame Lock capability.
- The tool can work to simulate the behavior of distributed inter-tile synchronization middleware (e.g. SAGE)



Process for creation of synchronization mismatch video measurement set (Target configuration: 2x2 tiled display)



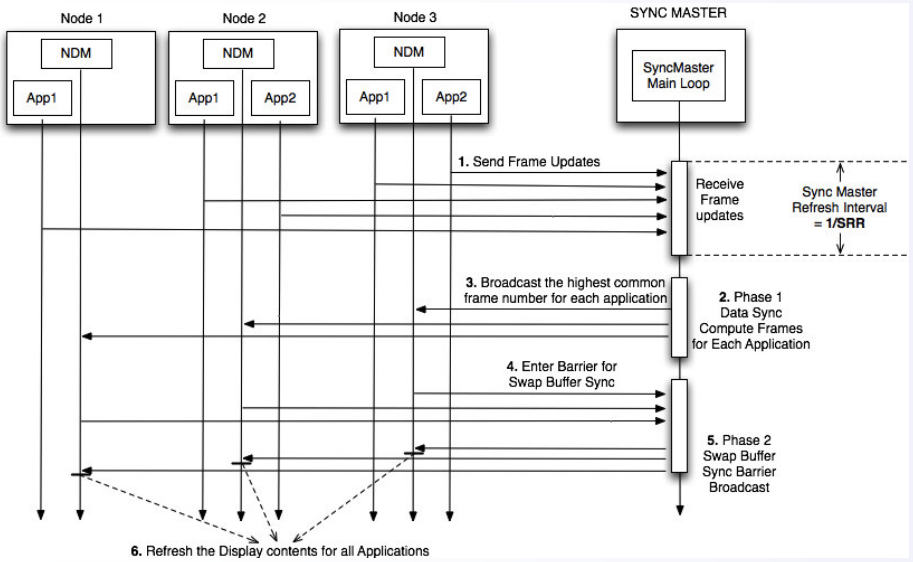
Example results for Double Stimulus Impairment Scale (DSIS) evaluation values for various tile configurations using design tool

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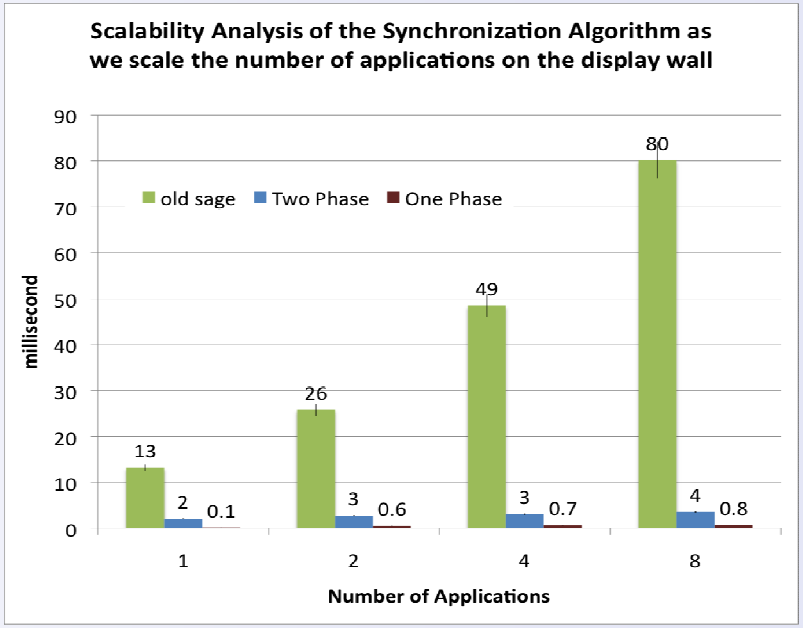
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New SAGE Inter-Tile Synchronization Algorithm

- We have developed with UIC/ EVL a two phase frame synchronization algorithm that provides more accurate inter-tile synchronization for tiled displays.



New Inter-tile Synchronization Algorithm



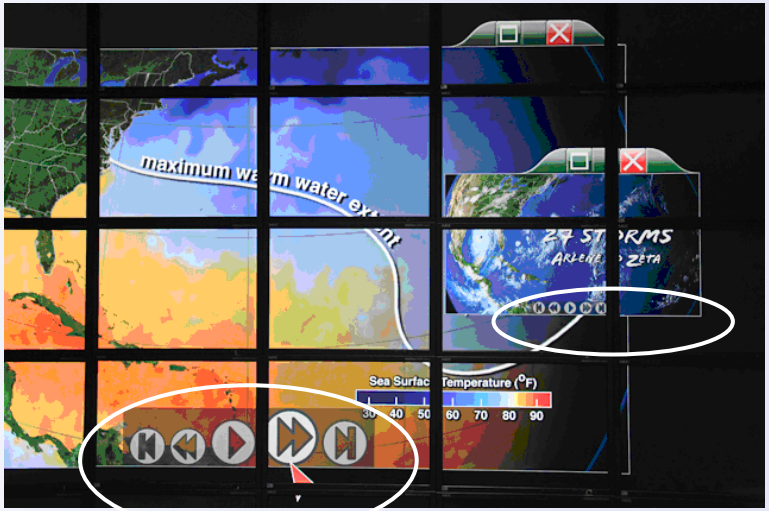
Inter-tile Synchronization Algorithm Performance

Acknowledgments: (UIC/EVL) Sungwon Nam, Venkatram Vishwanath, Luc Renambot, Jason Leigh (TACC) Byungil Jeong

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SAGE Application Development Toolkit

- UIC/ EVL and SLA has developed a SAGE application development toolkit
- The SAGE application toolkit supports developing applications on tiled display with familiar desktop look and feel
- The toolkit supports following features:
  - *Scalability:*
    User interface components automatically adapt to the target display size, resolution and application window size.
  - *Interaction Device Independent:*
    Allows users to interact with the application using any supported user interaction device (e.g. Wiimote, Gyro mouse, etc.)
  - *Multi-applications, Multi-User:*
    Multiple applications can use the toolkit and multiple users can simultaneously interact with one or more applications
- SLA has recently added a Java-C/C++ interface to access the toolkit from Java applications.



Scalable Interface components
Auto-scale with window size



Font auto-scales with window size

Acknowledgments: (UIC/EVL) Ratko Jagodic, Jason Leigh

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References

1. Sachin Deshpande ""A Method for Synchronization Mismatch Perception Evaluation For Large Ultra High Resolution Tiled Displays," in *IEEE Quality of Multimedia Experience (QoMEX)*, July 2009
2. Sachin Deshpande, C. Yuan, S. Daly, I. Sezan, "A Large Ultra High Resolution Tiled Display System: Architecture, Technologies, Applications and Tools," to appear in *IDW 2009*, December 2009
3. Sachin Deshpande, S. Daly, "Synchronization Mismatch: Vernier Acuity for Large Ultra High Resolution Tiled Displays," to appear in *Proceedings of SPIE Electronic Imaging*, January 2010
4. Sungwon Nam, Sachin Deshpande, Venkatram Vishwanath, Byungil Jeong,Luc Renambot, Jason Leigh, "Multi-Application Inter-Tile Synchronization on Ultra-High-Resolution Display Walls," to appear in *ACM Multimedia Systems*, February 2010